Space Weather Forecast

Issued on Tuesday, 12 July 2022 at 01:05 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further M-class flares likely with a slight chance of X class flares giving R1 to R3 Radio Blackouts. Chance of G1/Minor Storms mainly late day 1 (12th) into day 2 (13th).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, the largest being an M1 originating from an active region located in the southeast quadrant. A CME (Coronal Mass Ejection) was observed off the western limb, around 11/1300 UTC, however its analysis revealed that it's not Earth-directed. No other Earth-directed CMEs were observed in available imagery.

There are seven sunspot regions on the visible disc in total, with the two largest now more or less in the centre of the disc. Of the two newly numbered regions in the east, the one in the southeast quadrant has developed a delta configuration, which explains why the largest flares are currently coming from this region. The latest active region, in the northeast quadrant, may reveal further spots as it continues to rotate on the visible disc.

Solar Wind / Geomagnetic Activity: The expected CME that left the sun on the 08 July possibly arrived at Earth in the UTC afternoon. The solar wind remained slow-ambient but sustained a sudden increase around 11/1620 UTC, its speed rising from 320 to to 360km/s. Similarly, the number of particles comprising the solar wind rose sharply at the same time, and so did the magnetic field strength associated with these particles. The important north-south component was negligible initially but became moderate and largely negative. The net result of the above solar wind measures was Quiet to Unsettled geomagnetic activity with a provisional Active interval between 11/1800-2100 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be moderate with further moderate-class flares likely and a slight chance of strong (X-class) flares.

Solar Wind / Geomagnetic Activity: A CME may arrive at Earth at the end of day 1 (12th) or early on day 2 (13th). Solar winds are expected to become enhanced under the influence of the HSS from CH99/+, and stay elevated through to day 3, before slowly easing. Overall geomagnetic activity is expected to start Quiet but to become increasingly Unsettled and Active at the end of day 1 and into day 2 (12th and 13th), with a Chance of G1/Minor Storms under the influence of the CME. Geomagnetic activity then returning to mostly Quiet levels on days 3 and 4 (14th & 15th).

Energetic Particles / Solar Radiation: Unless there is significant sunspot development, the high energy proton flux (greater than 10 MeV) is likely to remain at Background levels. There is

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however a daily Slight Chance of S1 or greater, due to the presence of two relatively large sunspot regions on the centre disc, particularly as they've begun to move across the western hemisphere.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	50	1	1
Strong	G3	No	2	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	20	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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